REMARKS

The following is in response to the non-final Office Action dated April 7, 2004. The Applicant hereby requests that this case be reconsidered in light of the following.

STATUS OF CLAIMS

Claims 1-19 were pending.

Claim 20 is newly added.

Accordingly, Claims 1-20 are pending.

CLAIM REJECTIONS

In Section 5 of the Office Action, Claims 1-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 5,615,367 to Bennett et al. ("Bennett") in view of U.S. Pat. No. 6,643,493 to Kilgore ("Kilgore"). In response, the Applicant respectfully submits that the Examiner has not established a *prima facie* case of obviousness in regards to Claims 1-19, and, therefore, that these claims are allowable.

CLAIM 1

As the Examiner is aware, to establish a valid *prima facie* showing of obviousness: (i) each and every element and limitation of the invention as claimed must be shown or suggested in the combined references; (ii) there must be some motivation to combine the references; and (iii) there must be a reasonable expectation of success in combining the references. See M.P.E.P. § 2143 (May 2004). Here, since neither Bennett nor Kilgore show or suggest either: (i) a denormalized database; or (ii) unique student identifiers contained in a master student table and related data tables linked to the master student table, as recited in Claim 1, these references fail to show or suggest all the elements and limitations of Claim 1. Additionally, the Examiner has failed to set forth a showing, based on Kilgore and Bennett or otherwise, of why one of ordinary skill in the art would have been motivated to combine Kilgore and Bennett to arrive at the presently-claimed invention.

The Bennett patent discloses a relational database 155 (see FIG. 1B) that includes "design documents" 366, 371 (see FIGS. 3C-3E) that allow a user to customize how data is presented/displayed when accessing the database. To facilitate creating design documents, a data modeling module 130 is provided (see FIGS. 4A-4F). The data modeling module 130 is an interface where the user graphically selects data tables for inclusion in a design document and then graphically links the tables to one another (*i.e.*, the graphical "link" establishes an indication of the user's desire for there to be a relation or logical link between the two tables). Once the user graphically signifies that two tables are to be linked together, the data modeling module follows an internal procedure for attempting to logically link the two tables together (see FIGS. 7A-8B). For example, the module may: (i) determine a unique key for one of the tables; (ii) determine if a foreign key relationship exists between the selected tables, as would enable the use of an existing link; (iii) if there is no foreign key relationship, compare the unique key to the index (or indexable fields) of the other table, to determine possible links/relationships; and (iv) graphically display the derived, suggested link(s) to the user, for acceptance or rejection.

Like most other relational databases, the system in Bennett utilizes a normalized data structure for reducing error and providing more flexibility in analysis. See Bennett, Col. 3, lines 6-24; Col. 6, lines 58-65; Col. 16, lines 60-67. This means that: (i) the database uses many smaller tables with fewer fields; (ii) redundant fields are eliminated by mapping all the fields in each data table; and (iii) each table must be linked through an index of another table instead of directly to that table. In fact, the purpose behind the "automatic," GUI-based table linking system in Bennett is to largely eliminate the need for users to become practiced in normalizing databases – instead, the system "does it for you." See Bennet, Col. 3, lines 24-48 ("What is needed is a system and methods whereby ordinary end users, particularly those with no data processing experience or training, may apply the relational approach to a database management problem in a simple, intuitive fashion. ...[S]uch a system should provide tools for automating the task of data modeling in a relational database system.")

Kilgore discloses a database for registering students in courses and generating, collecting, processing, and reporting student performance. See Kilgore, Col. 2, lines 56-60. The process utilizes a normalized relational (SQL) database to store information related to students in which

each student is assigned a "Unique Student ID". See Kilgore, Col. 4, lines 16-17; also, notice in the figures in Kilgore the lack of repeated fields that do not contain linking information, which indicates a normalized database. Information such as the student's name, sex, address, phone number and e-mail address are associated with the Student ID. The database consists of a normalized collection of data tables, the predetermined layout of which is shown in FIG. 1. (That is, where a database designer would normally start by first "roughing out" a database and then normalizing the database, Kilgore provides a database layout that is already normalized). Each table has a unique name. See Kilgore, Col. 3, lines 34-39.

Like Bennett and Kilgore, the present invention relates to a computer database, in this case for tracking/storing student information. However, contrary to Bennett and Kilgore, the present invention utilizes an adaptable, modified star schema database having a denormalized structure. That is, instead of having a number of smaller tables linked to one another, and with few or no redundant fields, the database of the present invention: (i) is purposefully denormalized, *i.e.*, not optimally divided into smaller tables each with fewer, non-redundant fields; (ii) may have many redundant data fields, *i.e.*, redundant fields other than fields containing linking information; and (iii) utilizes a centralized master table (the master student table 12) that acts as the hub of the database, *i.e.*, various table "branches" are linked to the master table by common student identification codes but are not modified to match or correspond to the master student table 12.

To elaborate, as shown in FIG. 1, at the core of the present invention is the master student table 12. The master student table 12 includes a plurality of records, each of which relates to a single student, and each of which typically contains student name and student identification fields. A number of related data tables 22, 24, 26 are linked directly to the master student table 12 by way of the student identification codes, *i.e.*, the related data tables 22, 24, 26 have a student identification field linked to the student identification field of the master student table 12. Where necessary, other related data tables are linked to the master student table 12 by linking tables 52. The linking tables 52 contain a field for the student identification, as well as a field for concatenated identification codes (code strings comprising several relevant shorter codes chained together) which define links to downstream tables. For populating the database, all data is

loaded directly from needed tables in a denormalized manner, wherein the needed tables are not modified to match or correspond to the master student table. "This permits all data to be loaded regardless of condition or degree of completeness allowing the use of the system 10 and determination at a later time about what data should be cleaned up or added." Page 6, lines 9-19.

Having a denormalized database with a modified-star data structure (a centralized master table to which related data tables are linked by way of identification codes or concatenated identification codes) provides many benefits. First, unlike normalized databases, there is no need to map all incoming data to an intermediate database, and to then clean and load the data to a final, target database. Instead, this step is bypassed entirely, in favor of source data being mapped directly to target data with possible redundant fields, etc. Thus, as mentioned above, preexisting school system data can be loaded regardless of the condition or degree of completeness of the data and data types. See Page 4, lines 1-15.

Additionally, since there is no rigid, fixed-target data model, no changes to the foundational database are required to accommodate new data types. In fact, new data types can be easily integrated into the final target database without additional redesigns or added costs. Despite this, the core design (master student table 12, related data tables linked by way of linking tables or student identifications) does not change from installation to installation, meaning that while the database of the present invention is adaptable, it is static enough to allow for efficiencies in data builds and in creating standardized reports. See Page 4, lines 1-15.

Finally, there is no need to map data table fields for normalization, which adds time and expense to implementing a functioning system, and drill-down and data mining capabilities are enhanced. See Page 4, line 31-Page 5, line 12.

Claim 1 is directed to a denormalized database. While "denormalized" is only recited in the preamble, since it does not relate to function or intended purpose, but instead defines the claimed invention structurally, it is believed relevant to a determination of patentability. See M.P.E.P. § 2111.02 (May 2004)("Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation.") In light of the above, it should be apparent that neither Bennett nor Kilgore disclose, suggest, or otherwise relate to denormalized databases. Instead, in Bennett data tables are automatically linked in a normalized database by

comparing unique keys from one table to the index of another table, to obviate the need for a user to manually normalize or otherwise optimize the database. Similarly, while Kilgore relates to tracking student progress, it only discloses a normalized database. As such, since the cited references fail to disclose or suggest each and every element and limitation of Claim 1, Claim 1 is believed allowable.

In further regards to Claim 1, on page 4 of the Office Action the Examiner states that while "Bennett does not teach a unique identifier corresponding to each student and an unique identifier corresponding to each student in a table..., Kilgore teaches a unique identifier corresponding to each student (col. 4, lines 15-20) and an unique identifier corresponding to each student in a table (col. 4, lines 15-27." While the Applicant agrees that Kilgore teaches a unique identifier to each student in a table, neither Kilgore nor Bennett disclose a database having unique student identifiers where those unique student identifiers are contained in both a master student table and in a plurality of related data tables linked to the master student table, as recited in Claim 1.

In particular, as discussed above, unique identifiers (either a student identification or a concatenated identifier) are used in the present database as means for linking the master student table and related data tables. The master student table includes a field with the student identifications, and each and every one of the related data tables includes a field with either the student identifications or concatenated identifiers uniquely related to the student identifications via linking tables. This facilitates the use of a denormalized database design according to the present invention. See Page 7, lines 16-29; Page 8, line 14-Page 9, line 20.

In Bennett, on the other hand, while there may be a unique identifier as noted at Col. 9, lines 18-20, there is no teaching that this unique identifier is used in a master data table and all related data tables. Instead, since Bennett utilizes a normalized database design, as discussed above, only pairs of directly-linked tables will typically have common data fields, and it is certainly the case that all the data tables will <u>not</u> have fields for unique identifiers. (The very point of database normalization is to eliminate redundant fields and to break down a database's structure into a number of smaller tables that only have as many fields as necessary to establish a primary key.) Similarly, while Kilgore may show a database with unique student identifiers, the

unique identifiers are not included in a master table and all related data tables. By comparing the different tables in FIG. 1 in Kilgore, it can be seen that Kilgore is using a normalized approach, and that only a couple of the tables have a field for a "unique identifier corresponding to each student."

It should be noted that while Kilgore mentions that "the tables share a key data element that is used to link the tables together" (Col. 3, lines 38-39), this is merely referring to directly-linked tables in a normalized database, where pairs or small groups of fields may have common fields containing linking data, and not to all the tables in a database having a shared or related unique identifier. This can be seen by referring to FIG. 1 and to Col. 3, line 60-Col. 4, line 39 in Kilgore, where it is noted that various groups of tables contain shared ID codes, which is typical in a normalized database. For example, table 12 has a "Hospital ID" which "is used to association information in table 12 with data in other tables" (Col. 3, line 66-Col. 4, line 3), while table 14 includes a faculty ID "which is used to relate the data in table 14 to the data in other tables." Col. 4, lines 4-14. All the tables in the database do not include a common or related code.

Since Bennett and Kilgore fail to show or suggest a database with: (i) a master student table with "at least one unique identifier corresponding to each student"; and (ii) a plurality of related data tables each having the unique identifier corresponding to each student, as recited in Claim 1, Claim 1 is believed further allowable over Bennett and Kilgore in combination.

As mentioned above, to establish obviousness, there must be some suggestion or motivation in the prior art to combine the references to arrive at the claimed invention. See M.P.E.P. § 2143.01. Here, it is respectfully submitted that there is no such motivation or suggestion in Bennett and Kilgore, and, therefore, that Claim 1 is further allowable over these two references combined.

As discussed above, Bennett, in effect, relates to a means for semi-automating database normalization, while Kilgore relates to a specialized normalized database for evaluating medical students' progress and performance. As such, these references inherently fail to suggest that they be combined to arrive at the invention in Claim 1, since combining them would still not result in a denormalized database. Moreover, where Kilgore "spells out" the structure of a particular

database for achieving its student evaluation process (see FIG. 1 in Kilgore), there would have been no need for combining the system in Kilgore with the one in Bennett, which is for purposes of helping users to build their own databases from scratch. In other words, the functionality offered in Bennett would be largely extraneous or useless in the system in Kilgore.

In Page 4, paragraph 3 of the Office Action, the Examiner states that "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the data tables of Bennett's method with the data table of Kilgore's method because Kilgore's data tables consist of sharing a key data element that is used to link the tables together... ." However, even to the extent some of the data tables in Kilgore share a key data element that is used to link the tables together, this provides no motivation to one of ordinary skill in the art to combine Kilgore and Bennett, since Bennett relates to an automatic process where such links are derived and suggested to the user. In other words, where Bennett takes two designated tables and attempts to automatically derive a logical link between them, Kilgore's alleged teaching of having shared key data elements for linking tables is irrelevant.

Since Bennett and Kilgore fail to suggest a motivation for one of ordinary skill in the art to have combined them to arrive at the present invention as recited in Claim 1, Claim 1 is further believed allowable over the Bennett and Kilgore references.

CLAIMS 2-19

Claims 2-19 all depend, either directly or indirectly, from independent Claim 1. As such, Claims 2-19 are believed allowable as depending from an allowable base claim, for the reasons discussed above. However, the Applicant further notes that many of the additional elements/limitations found in Claims 2-19 are neither shown nor suggested in Kilgore and Bennett, and, therefore, that Claims 2-19 are believed further allowable over Kilgore and Bennett in combination, irrespective of the status of Claim 1.

Claim 2 depends from Claim 1, and recites "a plurality of test results tables wherein each test results table represents a single standardized test event; and... wherein each test results table is individually linked to the master student table." While the Examiner states in Section 2 of the Office Action that Kilgore discloses such a feature, the Applicant respectfully submits that this is

not the case. More specifically, while Kilgore teaches tables containing test data (Col. 5, lines 1-11), these tables are not "individually linked to [a] master student table." Instead, as shown in FIG. 1, the test result-related tables 30, 32, 34 are linked to various other tables 26, 28 (none of which are a "master student table") in a conventional normalized manner.

Further, Claims 3 and 9-19 all include a "linking table" containing "a concatenated identification code corresponding to each student identification code." As set forth in the present application at Page 8, lines 14-27, the purpose of the linking tables and concatenated identification codes is to establish a link pathway between the master student table and downstream, related data tables, where necessary. Each concatenated identification code comprises a chained-together list of various other codes, for example a school number, a student link code, and a sequence code. The concatenated identification codes, in addition to being included in the downstream, related data tables, are associated with the student identification numbers in the linking tables. This establishes a link pathway from the master student table to all downstream tables, even though the downstream tables are not normalized.

Contrariwise, neither Bennett nor Kilgore show or suggest concatenated (chained-together) identification codes as contemplated in the present invention and recited in the claims. In fact, because both Bennett and Kilgore relate to normalized databases where "adjacent" data tables are logically linked together by way of common data fields, there is no need for concatenated identification codes across multiple linked data tables. Moreover, while the Examiner indicated that Bennett discloses concatenated identification codes at Col. 9, lines 12-29 and Col. 16, lines 20-50, and Kilgore at Col. 3, lines 56-67 and Col. 4, lines 1-65, the Applicant was unable to find any such teaching in these references at these locations. Instead, these sections of Bennett and Kilgore appear to relate to tables having different types of data fields and/or identification numbers associated with different tables, as is typically done in normalized databases.

CLAIM 20

Claim 20 is a new independent claim, characterizing the invention in an alternate manner, that is believed allowable for the same reasons as noted above in regards to Claims 1-19.

CONCLUSION

For the reasons set forth above, it is believed that the present case is in a condition for allowance, and the Applicant respectfully requests a Notice of Allowance at this time.

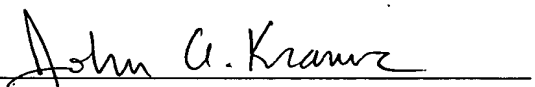
As Applicant has addressed every objection and rejection raised by the Examiner, it is respectfully requested that Examiner reconsider rejection of claims 1-19 and pass claims 1-20 to issue.

Applicant hereby petitions for a one-month extension of time in order to file an Amendment and Response on the above-identified application. The fee of $55.00 required under 37 CFR 1.17(a) is enclosed.

If any additional extension of time for the accompanying response is required, applicant requests that this paper be considered a petition therefor.

The Commissioner is authorized to charge any fees under 37 CFR 1.17(a) to (d), which may be required to Deposit Account No. 13-0235.

Respectfully submitted,

By 

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